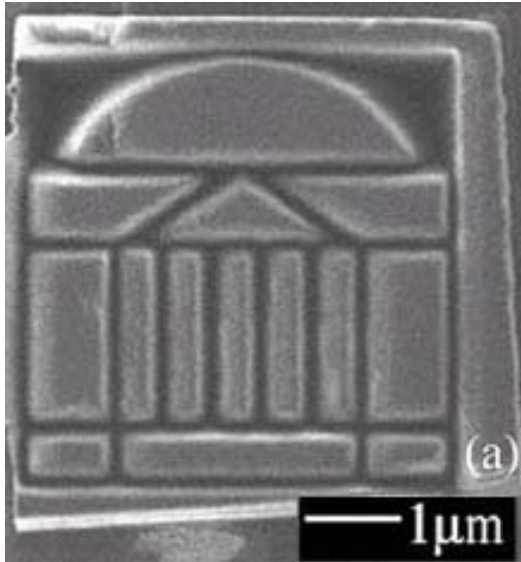
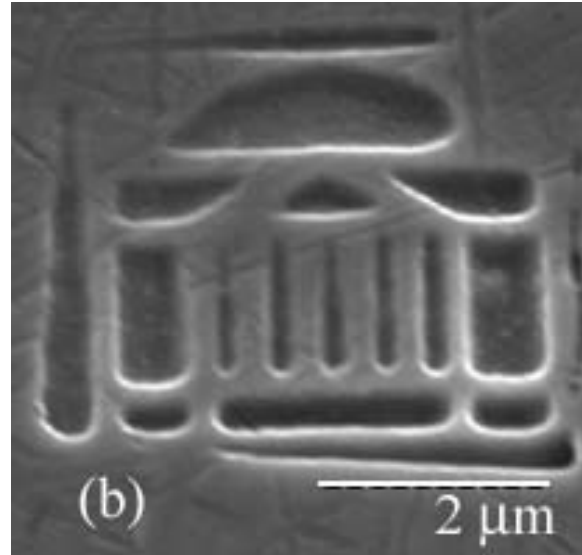


# Nanoscale Electrochemical Machining

*A. Trimmer, J. Hudson, UVa; R. Schuster, Berlin*



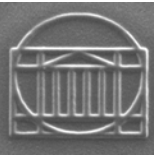
FIB-fabricated tungsten tool



Electrochemically machined pattern in Nickel, 2 ns pulse

## *Major advantages:*

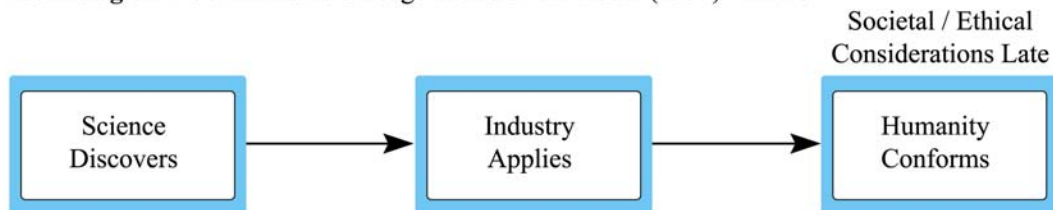
- \* *Parallel Printing of Complex “Stamp”*
- \* *High aspect ratio, controllable depth patterns*
- \* *Three dimensional relief (feature replicates tool)*
- \* *Sequential, aligned etching / deposition possible*



# Understanding Societal / Ethical Implications of Nanotechnology

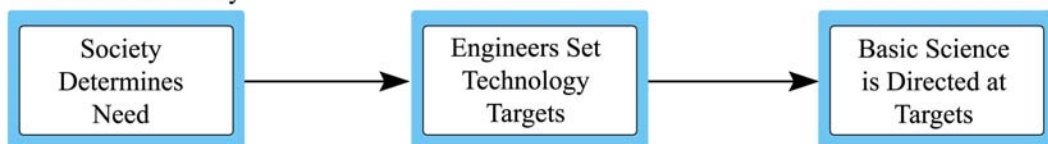
## The Technology Development Process: Competing Models

**Technological Determinism:** Chicago World's Fair model (1933) - Motto



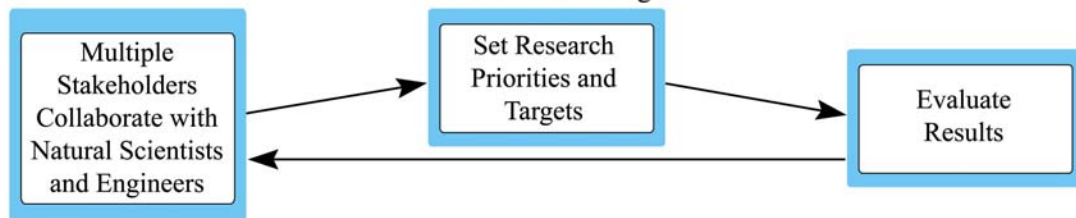
**Social Goals Drive Research:** Gorman, derived from Etzkowitz

Societal / Ethical Considerations Early



**Collaborate and Iterate:** Seemingly most desirable!

Societal / Ethical Considerations Throughout



***R. Catalano, J. Groves,  
M. Gorman, UVa***

***\* Collaboration with NSF NIRT program.***

***\* How does nanotechnology research change when its societal impact is considered?***

***\* Cognitive scientist Mike Gorman and materials scientist James Groves***